Then alas came the declining day with loss of physical and at last of mental vigor and finally the last closing of the eyes and a tablet in the Abbey.

Lister lived too long. It is better that every man should go before declining powers betray him. Strange to say both he and, if one may judge from various hints, his biographer also are disposed to be *laudatores temporis acti,* and mourn what seems to me a natural and inevitable development from antisepsis to asepsis, but which they regard as "a heresy."

So far from Lister's "practise having been discarded and his theory exploded" they have never been so firmly entrenched as now. Asepsis well suits civil practise in "clean" cases, but not in deeply infected cases. The Great War has recalled us to antisepsis, by reason of the intensity of its infections. The Carrel-Dakin method employs better antiseptics than carbolic and better methods of disinfection than Lister ever knew. The bacteriologist and the surgeon working together determine when a wound may be closed with assurance of success. Moreover if we can treat contaminated wounds early, before the bacteria have penetrated deeply and remove all the devitalized tissue and on and in it the great majority of the bacteria, the phagocytes can care for the remaining mild infection. Immediate closure may then be made.

It has remained for a non-medical snarling Irish critic, whose colossal egotism will readily suggest his name, and an anonymous medical reviewer both in the *Nation* (London) and another writer in the English *Review* whose article I have not seen, to belittle Lister and declare that he was not a great man.

With me the opinion of such judges as Volkmann, Virchow, Pasteur, Weir Mitchell and Lord Kelvin and the homage of thousands at the Great Congresses in London, Amsterdam, Philadelphia, Berlin, Montreal and elsewhere are enough. His detractors will have their day and cease to be, but "Humanity with uncovered head will salute" the Great Benefactor.

Is not my opening sentence correct?

Of course I had expected the superfluous "U" (a sort of intruding philological U-boat) in "tumour, labour," etc., although the Latin originals of all such words have no "u." Even the N. O. D. has "actor, also actour"! I must confess to surprise when I found the archaic "plaister" (which the N. O. D.) prints but marks "obsolete") especially as Lister himself wrote "plaster." W. W. KEEN

NOTES ON METEOROLOGY AND CLIMATOLOGY

THE "OLD-FASHIONED" WINTER OF 1917-1918[1]

EVEN though summer is upon us, it is not difficult to recall that last winter in the United States east of the Rockies was remarkably cold and snowy. The first killing frosts of autumn came early, and nipped crops which had started late and grown slowly in the cold spring and early summer. The South had a real winter, much to the detriment of fruit and truck crops which were caught by frost. By far the most intense winter conditions occurred in the regions from the Ozarks to New England, where low temperatures brought snow with passing cyclones, and the snow-cover in turn cooled the air excessively whenever the sky was clear. The unprecedented snow and ice blockades brought the well-known, long chain of uncomfortable and costly results.

In the eastern United States it was not surprising that autumn months which in many regions were the coldest on record, should be followed by a December and a January that defied the memories of the oldest inhabitants. For example, in Ohio, a 64-year record fails to show a colder December, and in New England, January seems to have been the coldest month at least since 1836, if an Amherst record may be considered as representative. In these cold months, new minimum temperatures were established broadcast. Early in December, for instance, temperatures as low as 20° to 31° below zero (F.) were observed

[1] A more extensive account is to be found in the *Geographical Review,* May, 1918, Vol. 5. This is based essentially on serial publications of the Weather Bureau, and on some press reports.

from western Tennessee to southern Ohio where the snow was deep at the time. One Weather Bureau observer in West Virginia reported a minimum of —37° F.; and another in Iowa, —40°. Extreme minima, —45° F., established new low records for South Dakota and Maine. On January 12, "that cold Saturday," a true blizzard with snow driven by a gale at a temperature down to 20° below zero (F.) tied up traffic almost completely for two days in the Middle West.

Relative to the cold land or snow surfaces, the open waters of the Great Lakes, Atlantic and Gulf were excessively warm; therefore they favored the development of numerous cyclones—some of them very intense. These supplied the snow which blockaded the railroads, or the rain which produced such disastrous floods in the ice-gorged rivers.[2] In the immediate vicinity of the Great Lakes, snow fell almost daily in January; and with many heavy falls, reached totals of 3 to 5 feet in that month alone. Chicago with 42 inches and Milwaukee with 53, saw the worst snow conditions in their histories. Farther south, in a belt from the Ozarks to the upper Ohio River, equally large amounts of snow were precipitated in January by the cyclones passing on the south, around the edge of the cold snow blanket. October and December were snowier than usual, especially December, in much of the eastern half of the country.

The weather was extraordinary not alone in the eastern United States: west of the Rockies the winter was one of the warmest on record. Extreme dryness prevailed in the southwest; but extraordinary rainfall occurred in the northwest. In December a temperature of 86° below zero (F.) was reported from the Upper Yukon, at the mouth of the Pelly River. If authentic, this established a record for North America which is only 4° (F.) below the earth's extreme surface minimum —68° C. (—90.4° F.), observed in Siberia in 1892.[3] Northern Sweden at about the same time had unprecedented coldness —57° C. (—70.6° F.) at Asele, and reports from Spain, central plateau of France and southwestern Asia tell of a winter of extreme severity.

Why is the world having such unusual weather? This is a period of sun-spot maximum—a time when solar radiation comes to its maximum; a condition occurring on the average once in 11 years.[4] Experience has shown that at such times there is a general tendency in winter to strong continental anticyclones and ocean cyclones; with corresponding storminess and coolness.[5] For North America, a strong winter anticyclone generally seems to favor coldness in the east and warmth in the west.[6] Locally, the snowiest and coldest weather occurs where, in spite of low temperatures, the supply of moisture is abundant and the temperature contrasts produce the storminess requisite to precipitate it as snow. Then this snow keeps the air cold and helps to make more snow; until important changes in general winds dominate the weather and eliminate the snow-cover—as was the case early in February, 1918. While the present degree of solar activity lasts, further occurrences of extreme weather are not unlikely.

METEOROLOGY IN THE ARMY AND NAVY

SINCE weather has much to do with military operations, especially flying,[7] it was natural that before one month had passed after the entry of the United States into the war, instructors had been sent to the flying school at Toronto for preparation to teach meteorology at the six new aviation ground schools in the United States. This work has progressed quietly ever since. Professor R. DeC. Ward,

[2] See *Mo. Weather Rev.*, Feb., 1918.

[3] See note, "The Lowest Air Temperature at a Meteorological Station," *Mo. Weather Rev.*, Vol. 45, 1917, pp. 407–408.

[4] For a further discussion, see C. G. Abbot, "The Sun and the Weather," *The Scientific Monthly*, Vol. 5, Nov., 1917, pp. 400–410.

[5] *Cf.* H. Arctowski, *Bull. Am. Geog. Soc.*, 1916, Vol. 42, pp. 270–282.

[6] See T. A. Blair, "Some Temperature Correlations in the United States," *Mo. Weather Review*, Vol. 45, 1917, pp. 444–450.

[7] *Cf.* R. DeC. Ward's most recent articles, *Scientific Monthly*, February and April, 1918; and in *Jour. of Geography.*

the instructor in aeronautical meteorology at the U. S. Army School of Military Aeronautics at the Massachusetts Institute of Technology, has published a syllabus of his course of ten lectures,[8] and also the essentials of these ten as condensed into three lectures.[9] This presentation of "Meteorology and War-Flying" gives the essence of what the aviator needs to know, and contains full references to this rapidly developing application of meteorology. Major (formerly Professor) Wm. R. Blair has prepared a report on "Meteorology and Aeronautics,"[10] the purpose of which is "to show the sort of atmospheric data available and to put the subject in such shape as may make it bear directly on the problems which are met in aviation."

While the aviators were being trained, the Signal Corps was establishing its meteorological service abroad. As the first contingents of the American Army went overseas, Majors W. R. Blair and E. H. Bowie, appointed respectively from the aerological and forecasting divisions of the Weather Bureau, were put in charge of the meteorological work. In November those responding to a call for a large number of meteorologists were given a period of intensive training at more than a score of Weather Bureau stations. Professor W. J. Humphreys's new book, "The Physics of the Air," which is being published in the *Journal of the Franklin Institute,* was of great help to the more advanced students. This work is a highly valuable contribution to the science, for it covers the fundamentals of meteorology in such a way that it can be used readily as an advanced text-book.

More meteorologists are needed. So a Signal Corps School of Meteorology has been established at College Station, Texas. Here over 300 meteorologists, physicists, engineers and other technical specialists are about to begin an 8-week course in meteorology. Dr. Oliver L. Fassig, from the Weather Bureau at Baltimore and Johns Hopkins University, is chief instructor. There are to be three assistant instructors: Mr. W. T. Lathrop, from the Weather Bureau at Greenville, S. C., for instruments, observations and map-making; Lieutenant Wm. S. Bowen, for the aerological work; and Dr. C. F. Brooks, from Yale University, for the course in general meteorology. About thirty of the Weather Bureau men in the school will also assist in instruction.

In addition to this training of specialists—and perhaps induced thereby—are the short courses in meteorology included in the military instruction of the Reserve Officers Training Corps in many universities.

Meteorology in the navy has been developed by Lieutenant Commander Alexander McAdie, in charge of the aerographic section, and trained men are in service overseas and in this country. A school for men taking up this work is maintained at Blue Hill Meteorological Observatory under the guidance of L. A. Wells, chief observer and forecaster of the observatory.

Naval training units at the universities, are now, or will soon be, receiving instruction in marine meteorology.

The importance of meteorology has never before received such wide recognition, and in view of the permanent development of aeronautics, it seems safe to predict that hereafter it will always hold a more important position in the curricula of the universities.

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[8] SCIENCE, July 27, 1917, Vol. 46, N. S., pp. 84–85.

[9] *Mo. Weather Rev.,* Washington, December, 1917, Vol. 45, pp. 591–600.

[10] Report No. 13, 1917, National Advisory Committee for Aeronautics, Washington, D. C.

SPECIAL ARTICLES

CONCERNING SELECTIVE PERMEABILITY

IN most cases in living organisms, cell permeability does not even seem to violate the known physico-chemical laws. There are, however, several exceptions, notably in the intestines and kidneys, where the permeability is selective.

In considering the membranes that seem to disturb osmotic laws, it is often stated that they cause these disturbances because the